Remarks

Allowance of the pending claims is respectfully requested. Claims 1-25 remain pending.

In the Office Action, claims 1-6, 11-13 & 28-20 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Dias et al. (U.S. Patent No. 5,907,849) in view of Blott et al. (U.S. Patent No. 6,449,618), while claims 7-10, 14-17 and 21-24 are rejected under 35 U.S.C. §103(a) as being unpatentable over Dias et al. in view of Blott et al. as applied to claims 1-6, 11-13 and 18-20, and further in view of Badovinatz et al. (U.S. Patent No. 5,805,786), and claim 25 is rejected under U.S.C. §103(a) as being unpatentable over Dias et al. in view of Blott et al. as applied to claims 1-6, 11-13 and 18-20, and further in view of Carter et al. (U.S. Patent No. 5,909,540). These rejections are respectfully, but most strenuously, traversed and reconsideration thereof is requested.

With respect to the rejection to the independent claims, applicants respectfully traverse the combination proposed. Absent from the Office Action is an express teaching, suggestion or incentive identified in the art for making the combination. The justification for the combination of patents in the Office Action is that they allegedly teach the benefit of making the recovery process faster and more efficient by avoiding manual intervention, roll back or reposting of the recovered transactions. Applicants respectfully submit that this justification does not identify an adequate teaching, suggestion or incentive in the art itself for the combination proposed in the Office Action. In this case, the basis for the combination is believed drawn from applicants' own disclosure. Applicants' above-summarized technique comprises an approach for recovery from failures within a shared nothing distributed computing environment. Within this computing environment, one or more transactions affected by a failure are automatically executed to completion. It is applicants' disclosure which teaches that this execution is accomplished without rolling back and without reposting the one or more transactions. The protocol necessary to accomplish such a recovery and automatic execution of that transaction would not be readily apparent to one skilled in the art given the teachings of Dias et al. and Blott et al.

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In addition, Dias et al. describe a technique for recovering from a failure of a processing node in a partitioned shared nothing database processing system. The system described by Dias et al. is a high availability system, meaning that there cannot be a single point of failure. For example, reference column 1, lines 39-43 thereof. In contrast, the teachings of Blott et al. are directed to a real-time event processing system for processing a sequence of events generated by one or more applications. The Blott et al. system is an architecture which has a single point of failure on which the whole system depends. For example, reference column 8, lines 6-8. Thus, applicants respectfully submit that Blott et al. is deficient in teaching any recovery approach for a high availability system, such as described by Dias et al. Because the only approach described by Blott et al. comprises a single point of failure approach, applicants respectfully submit that one of ordinary skill in the art would not have been led by the teachings thereof to combine those teachings with Dias et al. as proposed in the Office Action.

For the above reasons, applicants respectfully request reconsideration and withdrawal of the obviousness rejection to the independent claims presented herewith based upon a proposed combination of Dias et al. and Blott et al.

Even assuming, arguendo, that the combination of Dias et al. and Blott et al. is proper, the combination still fails to teach or suggest features of the recited invention. For example, each of the independent claims presented recites automatically recovering from the failure within the shared nothing distributed computing environment without rolling back the one or more transactions and without requiring reposting of the one or more transactions. These characterizations are believed to distinguish applicants' invention from any combination of Dias et al. and Blott et al.

An "obviousness" determination requires an evaluation of whether the prior art taken as a whole would suggest the claimed invention taken as a whole to one of ordinary skill in the art. In evaluating claimed subject matter as a whole, the Federal Circuit has expressly mandated that functional claim language be considered in evaluating the claim relative to the prior art. Applicants respectfully submit that the application of these standards to the independent claims

presented herewith leads to the conclusion that the recited subject matter would not have been obvious to one of ordinary skill in the art based upon the newly applied patents.

As indicated in the Office Action, Dias et al. does not teach automatically recovering from failure, wherein one or more transactions affected by the failure are automatically executed to completion without rolling back the one or more transactions and without requiring a reposting of the one or more transactions. Applicants agree. For an alleged teaching of this concept, the Office Action relies upon Blott et al. However, applicants respectfully submit that the Office Action misinterprets the teachings of Blott et al. in this regard. Blott et al. expressly teach that in nearly all cases it is possible to recover to the last successfully processed event and to replay accepted events from that point forward. (See column 27, lines 23-31). This replaying of accepted events is a reposting of the accepted events, which is clearly contrary to applicants' technique recited in the independent claims presented. Again, applicants recite automatically recovering from the failure both without rolling back the one or more transactions and without requiring a reposting of the one or more transactions. Blott et al. expressly teach that the technique presented replays accepted events from that point forward. This replaying is a reposting of the events, and therefore teaches away from applicants' approach.

In the final Office Action, pages 9 & 10, the Examiner states that Blott et al. teach "filtering duplicate requests" at column 26, lines 6-8, which implies that recovery is done without "reposting" of the transaction. This characterization of the teachings of Blott et al. is respectfully traversed. As noted above, Blott et al. describe their recovery approach beginning at the bottom of column 26 and continuing onto column 27. As explained in this material, the Blott et al. recovery approach makes use of a feature known as recovery points, which may be viewed as markers that are inserted into a recovery log. A recovery point represents a transactionally consistent state of the database that can be reverted to as long as the logs are available (see column 27, lines 14-16). Blott et al. expressly teach a logging function wherein events are persistently stored, which enables recovery to the last successfully processed event, and replaying of accepted events from that point forward (see column 27, lines 23-31). This

replaying is in fact a reposting of the events, and therefore teaches away from applicants' approach.

The Examiner's citation to column 26, lines 6-8 is believed to be an error with respect to this aspect of applicants' claimed invention. This material in Blott et al. is discussing a backup maintenance procedure or service plan that is to be introduced after each established recovery point. Applicants respectfully submit "recovery" in this instance does not refer to recovery from failure as expressly recited in their independent claims. The daily maintenance and service plan changes discussed at the top of column 26 do not apply to recovery from failure per se, which is expressly discussed in column 27 as described above.

Still further, Blott et al. does not present any recovery technique for a shared nothing distributed computing environment such as recited by applicants. Blott et al. expressly teach the existence of a log that is always accessible to all processing nodes. This assumption does not apply in the case of a shared nothing distributed computing environment. Without this assumption, the recovery approach of Blott et al. would simply be inoperable, and thus, inapplicable, to such a shared nothing environment.

For these additional reasons, applicants respectfully submit that one of ordinary skill in the art would not have been led the teachings of Dias et al. in combination with Blott et al. to a recovery approach as recited in the independent claims presented. A whole new protocol is added by the present invention for a shared nothing computing environment to accomplish automatic recovery and automatic execution of one or more transactions affected by a failure. This automatic execution is recited to be accomplished without rolling back the transactions and without requiring reposting of the one or more transactions. No similar functionality is provided in either Blott et al. or Dias et al., or the other known patents. Further, applicants respectfully submit that accomplishing the necessary modifications to the approach of Dias et al. and Blott et al. would not have been readily achievable by one of ordinary skill in the art, as evidenced by the extensive disclosure and drawings of the present application.

For all the above reasons, applicants respectfully request withdrawal of the rejection to dependent claims 1, 2 & 3.

The dependent claims are believed allowable for the same reasons as the independent claims, as well as for their own additional characterizations. In this regard, applicants respectfully traverse the secondary obviousness rejections to claims 7-10, 14-17, 21-24 and 25 based on Dias et al. in view of Blott et al., and Badovinatz et al. or Carter et al. for the same reasons noted above with respect to the independent claims. With respect to the rejection of claim 25, applicants respectfully traverse the applicability of the teachings of Carter et al. Carter et al. describe an approach for providing highly available data storage using globally addressable memory. At column 24, lines 34-39, Carter et al. describe the existence of a shared memory subsystem which includes a coherent replication controller. Thus, Carter et al. expressly teach reliance on a shared memory subsystem, which teaches away from applicability to a shared nothing distributed computing environment. In a shared nothing distributed processing system, a shared memory subsystem for the processing nodes is not possible. Thus, applicants respectfully submit that one of ordinary skill in the art would not have extrapolated in some manner the teachings of Carter et al. for combination with a shared nothing distributed computing environment such as recited by applicants.

In view of the above remarks, applicants respectfully request allowance of all claims pending herein. Applicants' undersigned attorney is available should any remaining issue require resolution.

Respectfully submitted,

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